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EXAMINER	
SHEW, JOHN	
ART UNIT	**PAPER NUMBER**
2616	

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

8P

Office Action Summary	Application No.	Applicant(s)
	09/807,959	BARTON ET AL.
	Examiner	Art Unit
	John L. Shew	2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 20 June 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 1-11,13,14 and 22 is/are allowed.

6)☒ Claim(s) 12,15-21 and 23-25 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 05 August 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Claims 1-25 are pending in the present application. Claims 12, 13 have been amended.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 15 is rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura et al. (Patent No. 6108353).

Claim 15, Nakamura teaches a method of generating a synchronization pulse (Abstract lines1-18) referenced by a synchronization signal generating means, representing a symbol boundary in an OFDM signal (Abstract lines 1-23, Fig. 1, col. 2 lines 7-16) referenced by the demodulation apparatus for correlation between the OFDM data period and guard period at a position away from the modulated signal by one modulation time representing the symbol boundary, said signal comprising symbols (FIG. 1, column 2 lines 7-16) referenced by the Effective Symbol, each symbol being formed of successive complex samples (FIG. 4, column 6 lines 59-67) referenced by the

IQ Modulating Circuit 21 to form real portion and imaginary portion signals, each of said successive complex samples having a sample period (FIG. 1, column 1 lines 40-52) referenced by the OFDM modulation in modes 1-4 with each mode representative of a fixed number of symbols per frame for a defined sample period, and each symbol including useful symbol periods (FIG. 1, column 2 lines 7-16) referenced by the useful symbol represented by the Effective Symbol, said useful symbol periods being separated by guard spaces (FIG. 1, column 2 lines 7-16) referenced by the Effective Symbol Interval separated by the Guard Interval, with data in each guard space corresponding to part of the data in a respective useful symbol period (FIG. 1, column 2 lines 7-16) referenced by the symbol end side including a period having correlation to the guard interval head side i.e. a period having the same signal portion and the same interval on the end side, the method including the step of adjusting the timing of the synchronization pulse in units of multiple sample periods (column 8 lines 33-51) referenced by the averaging circuit to average the timing synchronization signals based on a predetermined number of symbols wherein the number of symbols can be 76, 55, 35, 15 each being a different sample period.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12, 16, 17, 18, 23, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (Patent No. 6108353) as applied to claim 15 above, in view of Stott et a. (Patent No. US 6628730).

Claim 12, Nakamura teaches a method of generating a synchronization pulse (Abstract lines1-18) referenced by a correlation circuit for generating a synchronization signal, representing a symbol boundary in an OFDM signal (Abstract lines 1-24, Fig. 1, col. 2 lines 7-16) referenced by the demodulation apparatus for correlation between the OFDM data period and guard period at a position away from the modulated signal by one modulation time representing the symbol boundary, comprising useful symbol periods separated by guard spaces (FIG. 1) referenced by the Effective Symbol Interval and Guard Interval, with data in each guard space corresponding to part of the data in a respective useful period (FIG. 1, column 2 lines 7-16) referenced by the symbol end side including a period having correlation to the guard interval head side i.e. a period having the same signal portion and the same interval on the end side. Nakamura does not teach the method including the step of (i) calculating an error in the current timing (ii) comparing the calculated error with a predetermined threshold and (iii) adjusting the timing of the synchronization pulse in response to the calculated error exceeding said predetermined threshold.

Stott teaches a method including the step of (i) calculating the error in the current timing (column 8 lines 20-33) referenced by the ZOOM state with the DELTA count determining the number of pulse unlock events occurring, (ii) comparing the calculated error with a predetermined threshold (column 8 lines 20-33) referenced by comparison

of the DELTA count to a predetermined value of 4, and (iii) adjusting the timing of the synchronization pulse in response to the calculated error exceeding said predetermined threshold (column 8 lines 20-33, lines 51-64) referenced by the transition from the ZOOM state to the HUNT state if the DELTA count is exceeded in order to retrack the timing of the rising edge of the correlated signal.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mode for analyzing the digital sample values over a relatively narrow range of Stott to the OFDM demodulating apparatus of Nakamura for the purpose of providing a demodulator for data transmitted by a COFDM system which may be manufactured simply and inexpensively as suggested by Stott (column 2 lines 34-38).

Claim 16, Nakamura teaches wherein the timing of the synchronisation pulse is adjusted in predetermined quantities corresponding to a plurality of sample periods (column 8 lines 33-52) referenced by the averaging circuit to average the timing synchronization signals based on a predetermined number of symbols wherein the number of symbols can be 76, 55, 35, 15 each being a different sample period.

Claim 17, Nakamura teaches a method of receiving an OFDM signal (Abstract lines 1-18, FIG. 5, column 5 lines 29-31, column 7 lines 8-19) referenced by the OFDM demodulating receiver apparatus, the method including the step of generating a synchronization pulse (Abstract lines 1-18) referenced by a synchronization signal generating circuit, and using the synchronization pulse in order to apply a Fast Fourier Transform to complex samples derived from the OFDM signal (FIG. 5, column 8 lines

41-51) referenced by the synchronization pulse from the Averaging Circuit 49 to the FFT Circuit 35 to adjust the timing of the OFDM signal at Antenna 31.

Claim 18, Nakamura teaches further including the step of providing when the timing of the synchronization pulse is altered a signal representing the degree of alteration (FIG. 5, FIG. 6E, column 8 lines 10-22) referenced by the Rough Sync. Signal and the alteration of the signal by the Time Sync Signal Generating Circuit 48. Nakamura does not teach applying to the transformed samples phase rotations determined by this signal.

Stott teaches applying to the transformed samples phase rotations determined by this signal (FIG. 2 column 4 lines 34-56) referenced by the phase error correction block 30 which receives the time sync 26 through the FFT 24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mode for analyzing the digital sample values over a relatively narrow range of Stott to the OFDM demodulating apparatus of Nakamura for the purpose of providing a demodulator for data transmitted by a COFDM system which may be manufactured simply and inexpensively as suggested by Stott (column 2 lines 34-38).

Claim 23, Nakamura teaches an OFDM apparatus for receiving an OFDM signal (Abstract lines 1-18, FIG. 5, column 5 lines 29-31, column 7 lines 8-19) referenced by the OFDM demodulating receiver apparatus.

Claim 20, Nakamura teaches a method of receiving an OFDM signal (Abstract lines 1-23, Fig. 1, col. 2 lines 7-16) referenced by the demodulation apparatus for correlation

between the OFDM data period and guard period at a position away from the modulated signal by one modulation time representing the symbol boundary, the method including the steps of generating a synchronization pulse (Abstract lines1-18) referenced by a synchronization signal generating circuit, and using the synchronization pulse in order to apply a Fast Fourier Transform to complex samples derived from the OFDM signal (FIG. 5, column 8 lines 41-51) referenced by the synchronization pulse from the Averaging Circuit 49 to the FFT Circuit 35 to adjust the timing of the OFDM signal at Antenna 31, the method further including the step of providing when the timing of the synchronization pulse is altered a signal representing the degree of alteration (FIG. 5, FIG. 6E, column 8 lines 10-22) referenced by the Rough Sync. Signal and the alteration of the signal by the Time Sync Signal Generating Circuit 48. Nakamura does not teach applying to the transformed samples phase rotations determined by this signal.

Stott teaches applying to the transformed samples phase rotations determined by this signal (FIG. 2 column 4 lines 34-56) referenced by the phase error correction block 30 which receives the time sync 26 through the FFT 24.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mode for analyzing the digital sample values over a relatively narrow range of Stott to the OFDM demodulating apparatus of Nakamura for the purpose of providing a demodulator for data transmitted by a COFDM system which may be manufactured simply and inexpensively as suggested by Stott (column 2 lines 34-38).

Claims 19, 21, 24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura and Stott as applied to claims 15, 12, 17, 18, 20 above, and further in view of Park et al. (Patent No. US 6470030 B1).

Claims 19, 21, Nakamura teaches a demodulating apparatus for OFDM signals including phase discrimination. Nakamura and Stott do not teach phase rotations are determined by values in a look-up table addressed in accordance with the signal representing the degree of alteration of the synchronization pulse timing.

Park teaches the phase rotations are determined by values in a look-up table addressed in accordance with the signal representing the degree of alteration of the synchronization pulse timing (FIG. 1, column 3 lines 64-67, column 4 lines 1-8, column 5 lines 10-14) referenced by the phase memory 560 of a lookup table for phase error estimation for synchronization.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the phase memory of Park to the OFDM demodulating apparatus of Nakamura and Stott for the purpose of providing an OFDM receiver with an optimal structure of resource utilization efficiency and chip area as suggested by Park (column 2 lines 8-16).

Claim 24, Nakamura teaches a method of generating a synchronization pulse (Abstract lines1-18) referenced by a correlation circuit for generating a synchronization signal, representing a symbol boundary in an OFDM signal (Abstract lines 1-23, Fig. 1, col. 2 lines 7-16) referenced by the demodulation apparatus for correlation between the OFDM data period and guard period at a position away from the modulated signal by

one modulation time representing the symbol boundary, comprising useful symbol periods separated by guard spaces (FIG. 1) referenced by the Effective Symbol Interval separated by Guard Interval, with data in each guard space corresponding to part of the data in a respective useful period (FIG. 1, column 2 lines 7-16) referenced by the symbol end side including a period having correlation to the guard interval head side i.e. a period having the same signal portion and the same interval on the end side, the method including the steps of receiving an OFDM signal by generating the synchronization pulse (Abstract lines 1-18, FIG. 5, column 5 lines 29-31, column 7 lines 8-19) referenced by the OFDM demodulating receiver apparatus with a synchronization signal generating circuit, using the synchronization pulse in order to apply a Fast Fourier Transform to complex samples derived from the OFDM signal (FIG. 5, column 8 lines 41-51) referenced by the synchronization pulse from the Averaging Circuit 49 to the FFT Circuit 35 to adjust the timing of the OFDM signal at Antenna 31, providing when the timing of the synchronisation pulse is altered a signal representing the degree of alteration (FIG. 5, FIG. 6E, column 8 lines 10-22) referenced by the Rough Sync. Signal and the alteration of the signal by the Time Sync Signal Generating Circuit 48.

Nakamura does not teach adjusting the timing of the synchronization pulse in predetermined quantities corresponding to a plurality of sample periods nor applying to the transformed samples phase rotations determined by the signal.

Stott teaches adjusting the timing of the synchronization pulse in predetermined quantities corresponding to a plurality of sample periods (FIG. 8, column 11 lines 11-19)

referenced by the sync section with the fine time synchronization FTIME an integer multiple adjusted to the sample index by the controller 570.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the mode for analyzing the digital sample values over a relatively narrow range of Stott to the OFDM demodulating apparatus of Nakamura for the purpose of providing a demodulator for data transmitted by a COFDM system which may be manufactured simply and inexpensively as suggested by Stott (column 2 lines 34-38).

Park teaches applying to the transformed samples phase rotations determined by the signal (FIG. 1, column 3 lines 64-67, column 4 lines 1-8, column 5 lines 10-14) referenced by the phase memory 560 of a lookup table for phase error estimation for synchronization.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the phase memory of Park to the OFDM demodulating apparatus of Nakamura and Stott for the purpose of providing an OFDM receiver with an optimal structure of resource utilization efficiency and chip area as suggested by Park (column 2 lines 8-16).

Claim 25, Nakamura teaches a demodulating apparatus for OFDM signals including phase discrimination. Nakamura and Stott do not teach phase rotations are determined by values in a look-up table addressed in accordance with the signal representing the degree of alteration of the synchronization pulse timing.

Park teaches the phase rotations are determined by values in a look-up table addressed in accordance with the signal representing the degree of alteration of the synchronization pulse timing (FIG. 1, column 3 lines 64-67, column 4 lines 1-8, column 5 lines 10-14) referenced by the phase memory 560 of a lookup table for phase error estimation for synchronization.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the phase memory of Park to the OFDM demodulating apparatus of Nakamura and Stott for the purpose of providing an OFDM receiver with an optimal structure of resource utilization efficiency and chip area as suggested by Park (column 2 lines 8-16).

Allowable Subject Matter

1. Claims 1-11, 22, 13-14 are allowed.

Response to Arguments

The arguments traversing the rejections of independent claims 12, 15, 20 and 24 have been fully considered. The examiner respectfully maintains the rejection on this claims.

Regarding claim 12, the cited limitations "(i) calculating an error in the current timing (ii) comparing the calculated error with a predetermined threshold and (iii) adjusting the timing of the synchronization pulse in response to the calculated error exceeding said predetermined threshold" are taught by Stott (column 8 lines 20-33). The error is

represented by the unlock events in the ZOOM state since the timing is in error during this state. The DELTA count of 4 is the threshold to switch between the ZOOM and HUNT states since timing synchronization error is detected. The adjusting the timing of the synchronization pulse is performed during the HUNT state to track the rising edge of the correlated signal. The obvious combination of Nakamura and Stott therefore cites all the limitations of claim 12.

Regarding claim 15, the cited limitation "the step of adjusting the timing of the synchronization pulse in units of multiple sample periods" is taught by Nakamura (column 8 lines 33-51). The averaging circuit to average the timing synchronization signals based on a predetermined number of symbols wherein the number of symbols can be 76, 55, 35, 15 each being a different sample period thus the timing of the synchronization pulse is depend on the number of symbols which is not absolutely fixed. The claim 15 rejection is not a combination of Nakamura with Stott nor Park. The teachings of the other references are not applicable in this rejection.

Regarding claim 20, the cited limitation "generating a synchronization pulse and using the synchronization pulse in order to apply a Fast Fourier Transform to complex samples derived from the OFDM signal...providing, when the timing of the synchronization pulse is altered, a signal representing the degree of alteration, and applying to the transformed samples phase rotations determined by this signal". The signal representing the degree of alteration is taught by Nakamura (FIG. 5, FIG. 6E,

column 8 lines 10-22) as represented by the Rough Sync. Signal and the alteration of the signal by the Time Sync Signal Generating Circuit 48. The Rough Sync Signal represents a rough degree of alteration. The application of phase rotations to transformed sampled is taught by Stott (FIG. 2 column 4 lines 34-56) through the use of phase error correction block 30 applied to the FFT. The sync signal is included with the FFT and is thus incorporated into the phase rotation adjustment being performed. The obvious combination of Nakamura and Stott therefore cites all the limitations of claim 20.

Claim 24 carries similar limitations as that of claim 20 and analogous arguments are applicable.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John L. Shew whose telephone number is 571-272-3137. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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